Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method comprising:

receiving [[a]] an orthogonal frequency domain multiplexing (OFDM) broadband radio signal having a plurality of modulation frequencies;

amplifying the OFDM broadband radio signal to drive a laser source to produce an optical signal having a plurality of spectral components;

optically transforming the optical signal to separate the plurality of spectral components into a plurality of corresponding photo-detectors;

performing an optical based time-domain Fourier transform on the plurality of spectral components while maintaining orthogonality; and

converting the plurality of spectral components into a plurality of separate electronic signals corresponding to the plurality of modulation frequencies.

2. (Original) The method of Claim 1 wherein optically transforming the optical signal is accomplished by transmitting the optical signal through a diffraction grating.

3. (Original) The method of Claim 1 wherein optically transforming the optical signal is accomplished by reflecting the optical signal off a diffraction grating.

4. (Original) The method of Claim 1 wherein said laser source is a vertical cavity surface emitting (VCSEL) laser.

5. (Original) The method of Claim 1 wherein said laser source is edge emitting.

6. (Original) The method of claim 1 further comprising:

demapping said separate electronic signals corresponding to the plurality of modulation frequencies.

7. (Original) The method of claim 6 further comprising:

deinterleaving said separate electronic signals corresponding to the plurality of modulation frequencies.

8. (Original) The method of claim 1 wherein the broadband radio signal is an ultra wideband radio signal.

9. (Original) The method of claim 8 further comprising Fourier transforming the optical signal to separate the plurality of spectral components.

10. (Currently Amended) A method comprising:

driving a plurality of laser emitters from a plurality of electronic signals of a plurality of modulation frequencies of an orthogonal frequency domain multiplexing (OFDM) signal to produce a plurality of optical signals of a plurality of spectral components;

performing an optical based time-domain Fourier transform on the plurality of spectral components while maintaining orthogonality;

optically inverse transforming the plurality of optical signals into a composite optical signal including the plurality of spectral components;

converting the composite optical signal including the plurality of spectral components into a composite electronic signal including the plurality of modulation frequencies; and

amplifying the composite electronic signal including the plurality of modulation frequencies for transmission as an ultra wideband radio signal.

11. (Original) The method of Claim 10 wherein optically inverse transforming the plurality of optical signals is accomplished by transmitting the plurality of optical signals through a diffraction grating.

12. (Original) The method of Claim 10 wherein optically inverse transforming the plurality of optical signals is accomplished by reflecting the plurality of optical signals off a diffraction grating.

13. (Original) The method of Claim 10 wherein said plurality of laser emitters are VCSEL.

14. (Original) The method of Claim 10 wherein said plurality of laser emitters are edge emitting.

15. (Original) The method of claim 10 further comprising:

interleaving and mapping said plurality of electronic signals of the plurality of modulation frequencies.

16. (Original) The method of claim 15 further comprising:

symbol wave shaping and IQ modulating said composite electronic signal including the plurality of modulation frequencies.

17. (Original) A method of claim 10 further comprising transmitting said composite electronic signal including the plurality of modulation frequencies as a broadband radio signal.

18. (Original) A method of claim 17 further comprising inverse-Fourier transforming the plurality of optical signals.

19. (Currently Amended) An apparatus comprising:

an antenna to receive a broadband radio signal having a plurality of modulation

frequencies;

a low noise amplifier coupled with the antenna to drive a laser source from the broadband radio signal to produce an optical signal having a plurality of spectral components;

a diffraction grating to optically transform the optical signal into the plurality of spectral components and to perform an optical based time-domain Fourier transform on the plurality of spectral components while maintaining orthogonality; and

a plurality of photo-detectors to convert the plurality of spectral components into a plurality of electronic signals corresponding to the plurality of modulation frequencies.

20. (Original) The apparatus of Claim 19 wherein said transform of the optical signal is accomplished by separating the optical signal through the diffraction grating.

21. (Original) The apparatus of Claim 19 wherein said transform of the optical signal is accomplished by reflecting the plurality of optical signals with the diffraction grating.

22. (Original) The apparatus of Claim 19 wherein said laser source is VCSEL.

23. (Original) The apparatus of Claim 19 wherein said laser source is edge emitting.

24. (Original) The apparatus of Claim 19 wherein the broadband radio signal is an ultra wideband radio signal.

25. (Original) The apparatus of Claim 19 wherein the diffraction grating optically transforms the optical signal into a plurality of Fourier components.

26. (Currently Amended) An apparatus comprising:

a plurality of coherent laser emitters, a plurality of electronic signals corresponding to a plurality of modulation frequencies to drive said plurality of coherent laser emitters to produce a plurality of optical signals corresponding to a plurality of spectral components;

a diffraction grating to optically inverse transform the plurality of optical signals into a composite optical signal including the plurality of spectral components and to perform an optical based time-domain Fourier transform on the plurality of spectral components while maintaining orthogonality;

a photo-detector to convert the composite optical signal including the plurality of spectral components into a composite electronic signal including the plurality of modulation frequencies;

an antenna to transmit a broadband radio signal having a plurality of modulation frequencies; and

a high power amplifier coupled with an antenna to amplify the composite

electronic signal including the plurality of modulation frequencies for transmission by the antenna as said broadband radio signal.

27. (Original) The apparatus of Claim 26 wherein said inverse transform of the plurality of optical signals is accomplished by transmitting the plurality of optical signals through the diffraction grating.

28. (Original) The apparatus of Claim 26 wherein said inverse transform of the plurality of optical signals is accomplished by reflecting the plurality of optical signals with the diffraction grating.

29. (Original) The apparatus of Claim 26 wherein said plurality of laser emitters are VCSEL.

30. (Original) The apparatus of Claim 26 wherein said plurality of laser emitters are edge emitting.

31. (Original) The apparatus of Claim 26 wherein the broadband radio signal is an ultra wideband radio signal.

32. (Original) The apparatus of Claim 31 wherein the diffraction grating inverse-Fourier transforms the plurality of optical signals.

33-40. (Canceled)